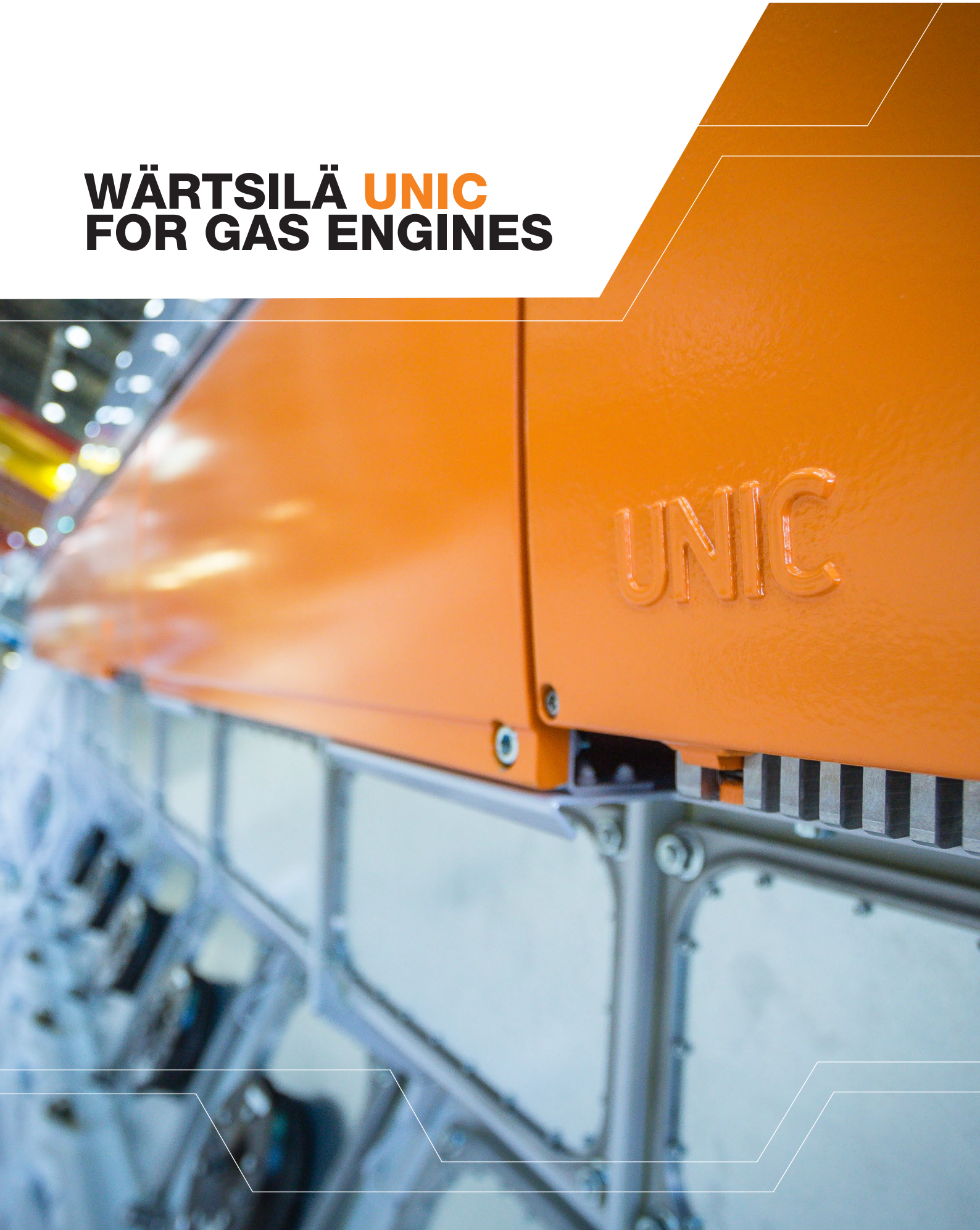
WÄRTSILÄ UNIC FOR GAS ENGINES



WÄRTSILÄ UNIC ENGINE CONTROL SYSTEM FOR GAS ENGINES

The Wärtsilä Engine control system (WECS) has been in operation for decades. However, the electronic devices in most engine systems have a lifecycle of 10 to 15 years. As components age, the risk of unexpected shutdowns increases. Over time, sourcing replacement components can become increasingly difficult as they may no longer be in production – and component obsolescence can increase both the severity and cost of a shutdowns. The Wärtsilä UNIC control system upgrade ensures reliable, efficient operation and global support for both marine and energy installations.

WHY UPGRADE YOUR WECS ENGINE CONTROL SYSTEM?

As an engine control system becomes obsolete, upgrading to a modern system brings a range of benefits, including improved availability and performance, extended engine lifecycle and better support. A modern system also meets major class requirements and offers improved cyber security to prevent cyber incidents from affecting the engine.
The Wärtsilä Unified Controls (UNIC) system takes care of all engine control and monitoring functions for both newly built engines and as a retrofit for older Wärtsilä engines. It is an embedded engine management system that handles start/stop management, engine safety, fuel management and speed/load control as well as charge air, cooling and combustion. UNIC is designed for maximum reliability and includes measures to ensure redundancy and fault tolerance along with a robust mechanical and electrical design.

UNIC FUNCTIONALITY

ENGINE CONTROL

Start/stop management includes start-block handling, load reduction and LT/HT-thermostat, wastegate and bypass control. Speed and load control is performed through an electronic controller with various operation modes. The solution includes ignition control and electronic fuel injection control (EFIC) technology.

ENGINE SAFETY

Safety management includes alarms, shutdowns, emergency stops and load reductions with fully hardwired safety for engine overspeed, lube oil pressure, cooling water temperature and external shutdowns.

ENGINE MONITORING

Monitoring covers engine temperature, pressure, speed, torsional vibration and load estimation.

WÄRTSILÄ UNIC FEATURES

Robust mechanical and electrical design
Electronic modules are mounted in specially designed terminal boxes equipped with cable glands to ensure easy servicing. UNIC sensors and actuators are reliable and easy to service and calibrate, and flying lead design is used wherever possible. The electronic modules feature current limiters and internal electronic fuses. Wires are twisted for better resistance against electrical interference and different types of signals are transferred in separate cables.

Reliable software architecture
The modular UNIC application platform is based on a total life-cycle approach to ensure efficiency and reliability. The system provides optimal performance with advanced control algorithms that adapt to existing operational properties for various engine processes and functions.

Diagnostics and adaptive controls
The UNIC system contains advanced diagnostics that can detect possible upcoming failures of components such as fuel injectors. The system also analyses the combustion process and engine behaviour to ensure performance even with varying conditions. Self-adaptability helps operators to manage parameter tuning.

Improved software filtering
Additional software filters have been added in UNIC to avoid measurement disturbances and noises. At unstable loads, the new charge air pressure reference filter prevents turbocharger speed oscillations due to rapid charge air reference changes. A low-pass filter is used to suppress undesired frequencies in the measured signal, while improved UNIC speed filters prevent potential oscillation caused by long firing intervals, super-soft couplings or system oscillation with other engines.

Operator interface and communications
An engine-mounted graphical display (LDU) enables standalone engine monitoring and troubleshooting without special equipment. Integrated diagnostics and an event display make maintenance easier.

TCP/IP-Modbus protocol enables sharing of process measurement data (events, alarms) to the vessel automation system or HMI system. The data can be time-stamped through the OPC server to facilitate improved troubleshooting, investigation and fault finding.

Cylinder balancing control
Adaptive cylinder balancing control improves running efficiency by making the load of all cylinders equal. The improved control algorithm evens wear and increases engine safety by reducing torsional vibrations as well as helping to reduce emissions. Cylinder peak pressure measurement enables advanced balancing control.

Combustion control
Combustion stability is improved when the engine is operated on variable/low cetane index pilot fuel or when the engine is operated in variable suction air temperature conditions (DF engines).

Load and operational control
Engine start times are shortened. Fault ride through prevents pole slip in case of a short circuit in the power grid, while load and operational control improves loading acceptance for both SG and DF engines and improves combustion stability in transient operation. There is support for engine operation at low load (requires mechanical changes on some engines).

WHY CHOOSE WÄRTSILÄ?

Wärtsilä supports you throughout the lifecycle of your installation. UNIC is designed for Wärtsilä engines, and as OEM (original equipment manufacturer) we are best placed to understand the technological requirements needed to produce the best engine control systems. As a service supplier, we guarantee reliable project execution and product lifecycle support. When it comes to upgrades, our project management and execution is based on decades of experience and a proven track record.

SCOPE OF SUPPLY

The scope includes:

- New control system hardware and software architecture
- New engine instrumentation and cabling with standardised flying lead connections
- A maintenance tool (Wärtsilä UNITool)
- Optional Engine-mounted local control panel with a display unit for engine operating data and an hour counter
- Optional features for engine performance improvements

Note that the plant or vessel automation system and human-machine interface (HMI) will need to be modified in order to take advantage of the new functions and data.

Wärtsilä's complete upgrade package includes design, engineering, installation, commissioning and training.

YOUR BENEFITS

Increase engine reliability with a robust mechanical and electrical design that includes redundancy, fault tolerance, diagnostics and adaptive features

Get a tailor-made solution that suits your needs, through a modular design and software application that adapts to a variety of Wärtsilä engine types

Ensure support across the system lifecycle with technical upgrades, life-cycle extensions and spare parts